

17615

21718

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.

Marks

1. (A) Attempt the following (any THREE) :

3 × 4 = 12

- (a) Define :
 - (i) Chip thickness ratio
 - (ii) Shear angle
- (b) State characteristics of tool material and mention the names of any 2 cutting tool materials.
- (c) State two advantages and two limitations of hydraulic press over mechanical press.
- (d) Explain the terms : (i) Spring back, (ii) Spanking with reference to bending operation.

(B) Attempt the following (any ONE) :

1 × 6 = 6

- (a) Draw a neat labelled sketch of single point cutting tool and show on it all (i) Rake angles, (ii) Cutting angles.
- (b) State the constructional features of extrusion dies. Give name of two components manufactured by extrusion dies.

2. Attempt the following (any FOUR) :

4 × 4 = 16

- (a) What are the desirable properties of cutting fluids ? Give the name of two cutting fluids mentioning its application.
- (b) Give the function of the following components :
- (i) Pilots (ii) Misfeed detectors
- (iii) Knock out (iv) Guide bush used in dies.
- (c) What is ceramic coating of cutting tools ? State specific reason of it.
- (d) Define the terms :
- (i) Tool wear (ii) Tool life
- (iii) Machinability (iv) Machinability index
- (e) With a block diagram explain working of forging dies.

3. Attempt the following (any TWO) :

2 × 8 = 16

- (a) In an orthogonal cutting operation, the following data have been observed.

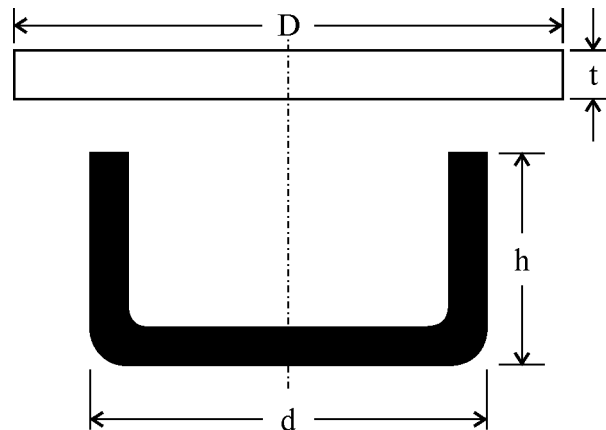
Uncut chip thickness	$t = 0.125 \text{ mm}$
Width of cut	$b = 6.40 \text{ mm}$
Cutting speed	$v = 2 \text{ m/s}$
Rake angle	$\alpha = 10^\circ$
Cutting force	$F_c = 570 \text{ N}$
Thrust force	$F_t = 230 \text{ N}$
Chip thickness	$t_c = 0.230 \text{ mm}$

Determine : Shear angle, the friction angle, shear stress along the shear plane and the power for the cutting operation.

6. Attempt the following (any TWO) :

 $2 \times 8 = 16$

- (a) (i) Define machinability. List the factors on which it depends.
(ii) The useful tool life of HSS tool machining Mild Steel at 20 m/min is 3 hours. Calculate the tool life when the tool operates at 25 m/min, assume tool life exponential $n = 0.125$.
- (b) (i) What is an OBI press ? State the function of flywheel in it.
(ii) Give the classification of press according to :
I. Source of power
II. Number of slides/rams
III. Method of actuation
IV. Type of process
- (c) The figure given below shows a cup to be drawn :



Shell diameter $d = 60$ mm

Radius of bottom inner corner of shell $r = 2.0$ mm

Height of cup $h = 50$ mm

Do not consider trimming of blank.

- (i) Calculate the diameter of blank from it.
(ii) Calculate the percentage reduction.
(iii) Calculate number of draws.
(iv) Radius on punch and die.